BLINDNESS AND ITS CAUSES.

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BLINDNESS AND ITS CAUSES*†

It was with some misgiving that I accepted the assignment of reporting to you some facts about blindness. Available source data are scarce and in many respects unreliable, and unfortunately I do not belong to the group of statisticians who enjoy making estimates that resemble rabbits drawn out of the magician's hat. However, if you are willing to accept the statements for what they are—mere indications of the probable truth—and will focus your attention as much upon what it might be desirable to know as upon what we already know, perhaps I can give you a general background of information.

But why analyze blindness? There are two reasons why analysis is important. In the first place, for the sake of the individual who is blind or potentially blind, it is important that everything possible should be known about his condition. That this is so can be shown by the following case, which is illustrative of many that are to be found in the records of commissions for the blind and schools for the blind. . . .

Our second reason for desiring thorough analysis of cases is that the facts concerning them may be summed up to produce for administrators, who are planning prevention of blindness and work for the blind, the necessary basis for sound planning. For example, the acceptance of routine Wassermanns of pupils in schools for the blind is partly attributable to group statistics showing syphilis to be an important cause of blindness among children.

How shall we analyze blindness? What are the essential facts?

Perhaps the most frequent question which has come to me concerns the number of blind in the United States or in some particular section of the country. On this point, the enumeration made in 1930 by the Bureau of Census

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*Address by Miss C. Edith Kerby, Statistician of the National Society for the Prevention of Blindness, at the annual conference of the Society in Columbus, Ohio, afternoon session, Friday, December 4, 1936.

†Under the program of the Social Security Act, commonwealths wishing to receive federal aid in the care of the blind will be expected to keep accurate records. The California Department of Public Welfare is making a study of possible revisions of its examination form blanks.

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gives the figure 65,431. However, this is admitted by the Bureau of Census to be an understatement. Consequently, in the same year also, the American Foundation for the Blind attempted to estimate the true figure by comparing census figures with registers kept by commissions for the blind in certain states, and arrived at the figure 114,000. Even this figure is open to question, chiefly because the various states differ in their concept of who is to be considered blind.

This brings us to our next point of analysis. If we are to secure data that is worthy of the name "statistics of the blind," we must consider how we shall define the term "blindness." One possible approach to this problem is that all states shall be brought into agreement on the definition of blindness. At the present time, among the thirty-three states having blind relief laws, there are ten which define blindness in terms of degree of vision, but there are seven different degrees, varying all the way from "loss of both eyes" to "visual acuity of 20/200." Fifteen additional states use indefinite statements such as "vision insufficient for tasks for which eyesight is essential." The remaining states have no definition mentioned in their laws. In spite of this variation, there is apparent at the present time a tendency to set the dividing line between the blind and the seeing world at visual acuity of 20/200, and to include in the blind group also individuals who have a peripheral field defect which limits the field of vision to an angular distance no greater than 20 degrees.

Even with a reasonably uniform definition of blindness, it is important to have some knowledge of the varying degree of visual handicap included among "the blind." The man on the street, with no knowledge of the problems involved, will define a blind person as "one who cannot see," by which he usually means an individual who is totally blind or who has light perception only. As a matter of fact, this description would cover about one-half to two-thirds of the persons usually considered blind. Among the recommendations of the Committee on Statistics of the Blind is a classification by degree of blindness which calls for five groupings. In Group 1 are those who are totally blind or who have mere "light perception." In Group 2 are those having "perception of motion" or only a negligible amount of "form perception" (under 5/200). Group 3 covers those having "traveling sight" (visual acuity of 5/200, but not 10/200). Group 4 includes those able to read large headlines (visual acuity of 10/200, but not 20/200. Group 5, or "the border-line" group, includes those having visual acuit of 20/200, and also those whose central visual acuity may be better than 20/200, but who have another visual defect—usually limitation of fields.

In analyzing a case of blindness, vision tests should be sufficiently accurate to enable us to classify the case in accordance with a scheme such as the one outlined. This knowledge of the degree of handicap is of interest not only to the statistician, but also to the administrator or case worker who may wish to use it as a guide in solving training or placement problems. It goes without saying that the ophthalmologist is obviously the best person to make an adequate determination of degree of vision.

The chief reason for selection of an ophthalmologist to give the eye examination, however, is to insure an adequate diagnosis. To be adequate, a diagnosis should indicate not only the part of the eye affected and the nature of its disorder (topographical factor derived from the Greek words meaning "to record the place"), but also the underlying cause of the eye condition (etiologic factor from the Greek "study of causation").

Wherever we have been forced to rely upon the records of old examinations, or upon recent examinations of cases which have occurred years ago, we have found practically no information as to etiology available. As a matter of fact, only the more recent studies of causes of blindness tend to give any etiologic data, although, oddly enough, the older studies did make reference to certain etiologies, such as accidents. With the gradual adoption of the cause of blindness classification of the Committee on Statistics of the Blind, we are beginning to acquire statistical data on causes of blindness in which the cases are cross-classified both by topographical and etiologic factors. Much more time and emphasis need to be placed upon gathering such cause data.

The major responsibility for examination necessarily rests with the ophthalmologist, but nurses and case workers in general can make a noteworthy contribution, first by educating the public to the importance of eye examination; second, by referring suspected cases for examination at the time of occurrence of blindness, or preferably before; and third, by gathering for the examining physician authentic facts about the histories of the cases.

Although, as I have indicated, existing information is far from complete and satisfactory, it may be of interest to note the following facts indicated by available data. Causes of blindness will be classified under the two headings mentioned above.

Cause of Blindness—Etiologic Factor

1. The most numerous group in any table at the present time is invariably the "unknown." Fully 40 to 60 per cent of all cases fall into this group.

As might be expected, it includes all of the cases having eye disorders for which the medical profession has as yet discovered no complete cure or preventive, such as cataract and glaucoma. For all we know, the solution of these problems may be just around the corner.

We have already noted the cases which are "unknown" largely because the ophthalmologic examination has been given long after the occurrence of blindness and the physician is unable to obtain sufficient facts to enable him to judge even the possible cause. This has been an important factor in our statistics to date, but it can and should be eliminated as cases tend to be brought for examination early.

2. Of the known causes, the most important group is that of the infectious diseases which account for from 15 to 25 per cent of the cases.

Syphilis and ophthalmia neonatorum (babies' sore eyes) are the most important diseases in this group. Although figures are particularly incomplete for syphilis, this disease is probably responsible now for more new cases of blindness among children than is ophthalmia neonatorum, and the figure for cases occurring among adults may be much larger than that for children. If the recently organized antisyphilis campaign proves effective, we may see within the next generation the same spectacular reduction in blindness from syphilis which has occurred during the past thirty years in the case of ophthalmia neonatorum (incidence has been reduced 75 per cent since 1907).

Other significant causes included in the group of infectious diseases are trachoma, meningitis, septicemia, tuberculosis, scarlet fever, measles, smallpox, and diphtheria. No one of these causes looms very large, with the possible exception of trachoma which, as you know, is very prevalent in some sections of the country and practically nonexistent elsewhere.

3. Accidents form the next largest group, being responsible for 15 per cent or more of blindness. Unfortunately, a large proportion of the cases are indefinitely specified merely as trauma. Hence it is impossible to give any satisfactory analysis of the causes of eye accidents.

4. The congenital and hereditary cases are probably responsible for about 10 per cent of blindness in the general population. Among the child population this is,

however, the most numerous group. In the current studies of causes of blindness among children made by the Committee on Statistics of the Blind, 50 per cent of the cases are attributed to these causes, although it is felt that at least a portion of the cases should more properly be classified under congenital syphilis. Moreover, our congenital cases need further study to determine whether the condition is hereditary or could be prevented by proper prenatal care.

5. The remainder of the cases are divided among the noninfectious systemic diseases, such as vascular diseases, nephritis, diabetes, etc., and the neoplasms and toxic poisonings. In our present statistics, less than 5 per cent of the cases are attributed to noninfectious systemic diseases. Undoubtedly, this group will prove much larger when causal relationships have been more definitely established by the medical profession.

Causes of Blindness—Topographical Factor

1. About one out of four cases of blindness in the general population appears to be due to cataract. The cases are mostly of the senile type, but congenital and traumatic cataracts are also included. In view of the fact that surgical treatment of cataract is possible, and generally successful in uncomplicated cases, the existence of this large group of individuals with cataract presents a challenge to case workers, such as public health nurses. Undoubtedly, there are many whose condition might prove to be amenable to corrective treatment.

2. Optic atrophy ranks second on the list. It includes about 15 to 20 per cent of the cases. The etiologic factor is not mentioned in most cases. However, indications are that the most important single cause of this condition is syphilis, with trauma, meningitis, neoplasms, and noninfectious diseases responsible for the remainder.

3. Glaucoma causes more than 10 per cent of blindness. Its etiology has not as yet been established and, as you know, the only hope for preventing blindness from this disease lies in medical supervision which is instituted early and carried out continuously throughout life.

4. Disorders of the choroid and retina account for about 10 per cent of blindness. Perhaps degeneration of the retina, which is usually considered hereditary in origin, is the largest single cause in this group. The group also includes detachment of retina as well as various inflammatory and atrophic conditions of these membranes. The latter are frequently designated as associated with infection, although the nature of the infection is not specified.

5. Affections resulting in opacities of the cornea (largely ophthalmia neonatorum, syphilis, and, in some places, trachoma) are responsible for about 10 per cent of blindness.

6. Developmental anomalies and degenerative changes in the eyeball account for another 10 per cent. The former are congenital in origin, and most of the latter are associated with trauma.

7. Uveitis and affections of the iris and ciliary body rank next with more than 5 per cent, these cases being attributed to infections and trauma.

8. Refractive errors, chiefly myopia, account for only a small percentage of blindness (under 5 per cent in this country, but it is interesting to note that European figures show a much higher incidence).

Age at onset of blindness should also be determined as definitely as possible at the time of the eye examination. Frequently the ophthalmologist will welcome investigation by the nurse or case worker on this point. It may not be an easy matter to determine the exact age at which the individual loses his sight. Nevertheless, it is helpful to try to do so, since the ophthalmologist may be guided by this information in making his prognosis, the worker for the blind will use it in determining the need for special training, and, finally, to the statistician, it supplies a fact which is valuable in itself as well as useful in determining trends. Although information on this point is quite as incomplete and inaccurate as that on causes of blindness, it may be of interest to quote the figures given in the 1920 census. If we weigh the ratios given in that report according to the Foundation's estimate of the true total, we find that the incidence of blindness among children under five years of age is about two in ten thousand. The rate falls off during the preschool, school, and the adolescent ages, but again reaches two at about the age of thirty-five. It increases up to the age of sixty, when it is about nine in ten thousand, and very rapidly thereafter until it reaches a very high rate of seventy-five in ten thousand at the age of eighty or over. At first glance, these figures seem to confirm the popular theory that if one lives long enough, he may become blind. (The chances are 1 in 130 for persons over eighty years.)

The ophthalmologist's examination will ordinarily include his prognosis and more or less definite recommendations for care and treatment to restore or preserve vision, when this is possible.

If all of these essential facts concerning the individual's eye condition are noted on his eye examination record, the particular type of record form that is used is immaterial. However, it may be desirable to call attention to the suitability of the eye examination form prepared by the Committee on Statistics of the Blind for this purpose. (This form is at present undergoing a slight revision which was decided upon at the time that the Social Security Board was developing its recommended form which is modeled closely on that of the committee.) Its items call for factual information summarized in a form which lends itself readily to tabulation.

One further word of warning concerning the statistics which I have given. They are based on a comparative analysis of such data as are available. The figures are, as I have said, essentially incomplete and too much faith should not be placed in their accuracy. It is highly desirable that the statistics which have still to be compiled shall have a much higher degree of uniformity in order that the findings of various studies may be combined and compared. It is for that reason that I have made a special point of stressing the recommendations of the Committee on Statistics of the Blind, which set a pattern for minimum standards, and can be expanded further as experience shows this to be necessary.

Throughout the country there is a renewed interest in the problems of the blind and of prevention of blindness due in part to the expanding of state budgets through federal grants. This seems to offer hope that we may reach our objective—a complete analysis of each case of blindness, to the end that each shall have adequate examination and treatment necessary to give maximum possible vision, and an adequate summary of facts concerning all cases of blindness.

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